

RESTRICTED INTERESTS AND TEACHER PRESENTATION OF ITEMS

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Restricted and repetitive behavior (RRB) is more pervasive, prevalent, frequent, and severe in individuals with autism spectrum disorders (ASDs) than in their typical peers. One subtype of RRB is restricted interests in items or activities, which is evident in the manner in which individuals engage with items (e.g., repetitious wheel spinning), the types of items or activities they select (e.g., preoccupation with a phone book), or the range of items or activities they select (i.e., narrow range of items). We sought to describe the relation between restricted interests and teacher presentation of items. Overall, we observed 5 teachers interacting with 2 pairs of students diagnosed with an ASD. Each pair included 1 student with restricted interests. During these observations, teachers were free to present any items from an array of 4 stimuli selected by experimenters. We recorded student responses to teacher presentation of items and analyzed the data to determine the relation between teacher presentation of items and the consequences for presentation provided by the students. Teacher presentation of items corresponded with differential responses provided by students with ASD, and those with restricted preferences experienced a narrower array of items.

Key words: autism, child effects, preference assessment, restricted interests, teacher behavior

Restricted and repetitive behavior (RRB) is a defining characteristic of autism spectrum disorders (ASDs; American Psychiatric Association, 2000; Lord, Rutter, & Le Couteur, 1994). Although RRB is also common in other populations (e.g., typically developing children between the ages of 2 and 4 years; Evans et al., 1997), RRB is more pervasive and prevalent in those with ASDs than in their typical peers (Berkson & Tupa, 2000; Honey, Leekman, Turner, & McConachie, 2007). Furthermore,

RRB is more frequent and severe in those with ASDs than in those with mental retardation (Bodfish, Symons, Parker, & Lewis, 2000).

One subtype of RRB is restricted interests in items or activities. Restricted interests describe the manner in which individuals perform activities or the types and range of activities in which they engage. Individuals with autism engage in more repetitive toy play than do both typical peers and peers with mental retardation (Tilton & Ottinger, 1964). For example, when playing with a toy car, an individual with autism might repetitively spin the wheels. In addition, individuals with ASD often engage with socially atypical items or activities. Charlop, Kurtz, and Casey (1990) described one individual who engaged in repetitive page flipping with phone books. Finally, individuals might engage with a narrow range of items or activities or an exclusive item or activity. For example, one individual's interest in maps was

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exclusive to the point that his sister reported it didn't allow them to "talk about anything else" (Mercier, Motttron, & Belleville, 2000, p. 414).

Restricted interests might lead to limited sources of stimulation and present barriers to achieving social, communicative, and educational goals. It can be difficult to identify effective and socially acceptable reinforcers for people with ASD, leading some researchers to examine the use of items of preoccupation (e.g., a phone book; Charlop *et al.*, 1990) in reinforcement-based interventions (Boyd, Conroy, Mancil, Nakao, & Alter, 2007; Charlop-Christy & Haymes, 1996, 1998; Charlop *et al.*, 1990). Restricted interests have the potential to limit learning opportunities as well as opportunities to interact with peers who have a broader range of interests, inhibiting an individual's repertoire and range of experiences. In addition, interrupting an individual's engagement with restricted items, or contexts in which the restricted interest item is not available, might evoke more severe topographies of problem behavior (Adelinis & Hagopian, 1999).

If one adopts Bannerman, Sheldon, Sherman, and Harchik's (1990) position that it is one's right to exercise choice, restricted interests should be accepted and we should not attempt to alter an individual's preferences. In fact, a great deal of behavior-analytic research has been dedicated to the systematic identification of preferences so that participants' preferences can be incorporated into programming. However, in an attempt to accommodate the narrow or idiosyncratic preferences of some individuals with ASD, caregivers, teachers, and professionals might inadvertently restrict the individual's range of experiences (e.g., activities). That is, adults interacting with children with ASD might tend to present those activities that the child already prefers, thus minimizing opportunities to expand preferences.

In some cases, those who care for individuals with ASD might present already preferred items according to a specified behavior program

designed to incorporate the participant's preferences. In other cases, consequences provided directly by the individual with an ASD might promote this caregiver behavior. Bates (1976) discussed how child behavior might influence adult behavior, which, in turn, might influence child behavior. Bates' discussion is the theoretical basis for an area of research referred to as *child effects* research. A number of child effects studies have examined the influence of behavior of typically developing children on adult behavior (Bohannon & Marquis, 1977; Fagot, 1984; Murray, 1979).

Bates' (1976) notion of child effects is relevant to caregiver interactions with students with restricted preferences. When caregivers present an initially preferred stimulus, these presentations are likely to be reinforced by positive reactions from the child. By contrast, presentation of an unfamiliar or nonpreferred stimulus might be met with a neutral or negative reaction from the child. In this way, child responses might differentially reinforce the continued presentation of a stimulus or class of stimuli that is already preferred, resulting in limited exposure to a wider range of stimuli. Revealing a relation between restricted interests and the likelihood of teacher presentation of items would be a reasonable first step in understanding the conditions that surround restricted interests; however, no study to date has examined this relation.

A study by Carr, Taylor, and Robinson (1991) provides one model for evaluating child effects. These authors captured the relation between child problem behavior and teachers' presentation of instructions. Twelve undergraduate students were asked to present discrete trials to pairs of preschool students; one preschooler in each pair typically exhibited problem behavior in instructional settings and the other was typically compliant with instructions. Over the course of the observation, teachers presented fewer trials to the children who engaged in problem behavior than to the

compliant children, and avoided those specific tasks that evoked problem behavior.

In the current study, we used procedures similar to those described by Carr et al. (1991) to examine occurrences of the behavior of students with autism and teacher presentation of items. Specifically, we were interested in describing how teachers' leisure-item presentation may have been influenced by the consequences provided by the students.

METHOD

Student Participants

Four male students (10 to 19 years old) participated in the study. All students had been diagnosed with ASD and received educational and clinical services in a residential setting. Teachers referred students who were considered to have restricted preferences and students who interacted with a broad range of leisure items (hereafter called *distributed interests*). All students participated in both phases of the study. All students responded to "yes" or "no" questions vocally or by nodding or shaking their heads accordingly. Caregivers of participants reported that none of them received leisure skills training during the course of the study.

Participants with restricted interests. Steve (19 years old) was reported to carry a Fisher-Price Elmo Phone with him during the day. It was reported that removal of this item or presentation of other leisure items typically resulted in problem behavior. Steve had a history of engaging in aggression and self-injury. He did not have a vocal mand repertoire, but he frequently pointed to items. Wayne (10 years old) was reported to have a strong preference for pictures of roller coasters. It was reported that removal of this item or presentation of other leisure items typically resulted in problem behavior. He had a history of engaging in self-injury and had a vocal mand repertoire.

Participants with distributed interests. Nick (17 years old) reportedly engaged with a variety

of leisure items during the day and did not engage in problem behavior in the context of item presentation or removal. He had a history of engaging in hand mouthing and did not have a vocal mand repertoire. Mark (10 years old) reportedly engaged with a variety of leisure items across the day and did not engage in problem behavior in the context of item presentation or removal. He had a history of hand mouthing and biting others. He had a vocal mand repertoire, and a picture exchange communication system was present during sessions.

Teacher Participants

Five teachers at a residential program for people diagnosed with ASD participated: four women (23 to 30 years old) and one man (25 years old). Four teachers were currently pursuing master's degrees (three in special education; one in applied behavior analysis). One teacher had obtained a master's degree in special education. Teachers did not have a history of working with the participants. Teachers had received 2 hr of training, unrelated to this project, on topics such as discrete-trial teaching and reinforcement.

Setting

Sessions were conducted in a separate research room at the participants' school. Rooms contained desks, chairs, cabinets, shelves, and materials for academic programming. An experimenter was present for, and used a camcorder to record, each session.

Response Measurement and Interobserver Agreement

Observers viewed recorded sessions and used handheld computers to record the item presented, removal attempts by teachers, and student behavior that occurred while each item was present.

Item presentation and removal. Observers measured duration of presentation for each item by recording item presentation and item

removal. Item presentation included the teacher placing the item on the student's desk, in the student's hands, or vocally presenting the item (e.g., "Do you want the ball?"). Item removal was recorded when the teacher physically removed the item from the student's desk or hands. Item removal was not recorded when teachers attempted to remove an item but were unsuccessful, or if the student threw the item. Observers also recorded removal attempts, which did not necessarily correspond with item removal. Removal attempts included physically grabbing the item and pulling the item away from the student, or vocally requesting the student to give the item back to the teacher (e.g., gesturing to hand the item to the teacher or saying, "Give me the ball"). Physical and verbal attempts sometimes occurred separately and at other times simultaneously. Instances in which physical and vocal removal attempts simultaneously occurred were recorded as one response. If a removal attempt was successful (the item was physically removed), then item removal was recorded.

Student behavior. Student behavior was recorded and coded in two categories—positive behavior and negative behavior—as in Zarcone, Crosland, Fisher, Worsdell, and Herman (1999). Positive behavior included positive vocalizations and approach responses. Positive vocalizations included laughing, smiling, requests for an item, and requests for teacher interaction. Approach responses included the first instance of student touching or grabbing the item presented. An approach response could be recorded only once per item presentation. Item engagement was also recorded and defined for each individual item and reflected functional interaction with the item based on the participant's skill level. Negative behavior included problem behavior, negative vocalizations, and avoidance responses. Problem behavior included self-injury and aggression. Negative vocalizations included requests for removal of item, screaming, crying, cursing, yelling, or negative

vocalizations, such as "no," "go away," or "stop." Avoidance responses included turning head or body away, using hands or body to block presentation of the item.

Instances of behavior were recorded as positive or negative vocalizations, problem behavior, and approach or avoidance responses. For Phase 2, the rate was calculated by dividing the total number of instances of a given behavior by the duration of item presentation. Duration measures were used to record item presentation and item engagement. Observers recorded the immediate onset of presentation and engagement and the immediate offset of item presentation. The offset of item engagement was recorded when engagement ceased for 2 s. We included a 2-s delay in an attempt to capture appropriate interaction with items that involved brief pauses (e.g., bouncing a ball). Percentage of item presentation was calculated by dividing the duration of item presentation by the total session duration. Percentage of item engagement was calculated by dividing the duration of engagement with an item by the duration of presentation for that specific item.

Interobserver agreement. A second observer scored a mean of 43% (range, 33% to 50%) of the sessions across all student participants. Each session was divided into 10-s intervals. Partial agreement was calculated by dividing the smaller number (or duration) of recorded events by the larger across observers, averaging these scores across the session, and converting them to a percentage. Mean agreement for all teacher behavior was 96% (range, 82% to 100%). Mean agreement for all student behavior was 98% (range, 72% to 100%).

Procedure and Data Analysis

Phase 1. The overall purpose of the study was to describe how teachers' leisure item presentation might be influenced by the differential consequences provided by individuals with autism. Phase 1 was conducted to inform the

items used in Phase 2, in an attempt to arrange differential consequences across students and items for teacher behavior. Specifically, we sought to identify (a) items that would produce differentiated responding for restricted interest participants and (b) items that would produce undifferentiated responding for distributed interest participants.

Experimenters selected items for Phase 1 that were similar to items found in the participants' natural environment, or items included in previous preference assessments. We chose not to include the Elmo Phone that Steve carried throughout the day because we were concerned that item presentation by teacher participants who had seen Steve around the school might be influenced by this extraexperimental history. The experimenter conducted three to five sessions with each participant, depending on the stability and clarity of the data, to assess student behavior evoked or occasioned by the presentation of each item. We used a single-stimulus presentation procedure similar to that described by Pace, Ivancic, Edwards, Iwata, and Page (1985), because we were interested in recording student behavior in the presence of each item. A single-stimulus presentation procedure allows repeated measures of student behavior following the presentation of a specific item; also, it avoids the possibility of a student never selecting nonpreferred items. Each session consisted of one presentation of each item, for a total of three to five presentations per item. Each item was presented for 30 s and removed independent of student behavior. No programmed consequences were provided contingent on positive or negative behavior exhibited by the students during Phase 1. We used the results of Phase 1 to identify four items per student to be used in Phase 2. For participants with restricted interests, we selected two items that produced high levels of positive behavior (putative reinforcers for teacher presentation of an item) and low levels of negative behavior and two

items that produced low levels of positive behavior and high levels of negative behavior (putative punishers for teacher presentation of an item). For participants with distributed interests, we selected four items that each produced relatively similar levels of positive behavior and no negative behavior.

Phase 2. Each teacher presented items to one student with restricted interests and one with distributed interests in separate 10-min sessions. The sessions conducted with the student with restricted interests provided an opportunity to observe teacher behavior that occurred when a student responded differentially to presentation of various items. Teacher behavior during these sessions was then compared to teacher behavior during sessions involving the student with distributed interests, who was less likely to provide differential responding for teacher presentation of various leisure items. At the start of the first session, the experimenter informed the teacher that he was interested in the student's interaction with the teacher and leisure materials. It was explained to the teacher that a debriefing of the study would take place after completion of the study. If a teacher asked the experimenter questions about the study, he or she was reminded of the debriefing after completion of the study. No additional instructions were provided. The teacher was given a box containing the items identified in Phase 1 and was instructed to present one item at a time and remove the previous item before presenting the next item (so that student responses could be attributed to a single item during data analysis). The teacher was also told that statements such as, "Do you want the ball?" were considered presentations, and teachers were reminded to avoid statements that offered two items simultaneously to the student (e.g., "Do you want the ball or the car?"). The teacher was not instructed to present every item or to present items at a specific rate. Also, the teacher was not instructed to keep the student seated at the desk.

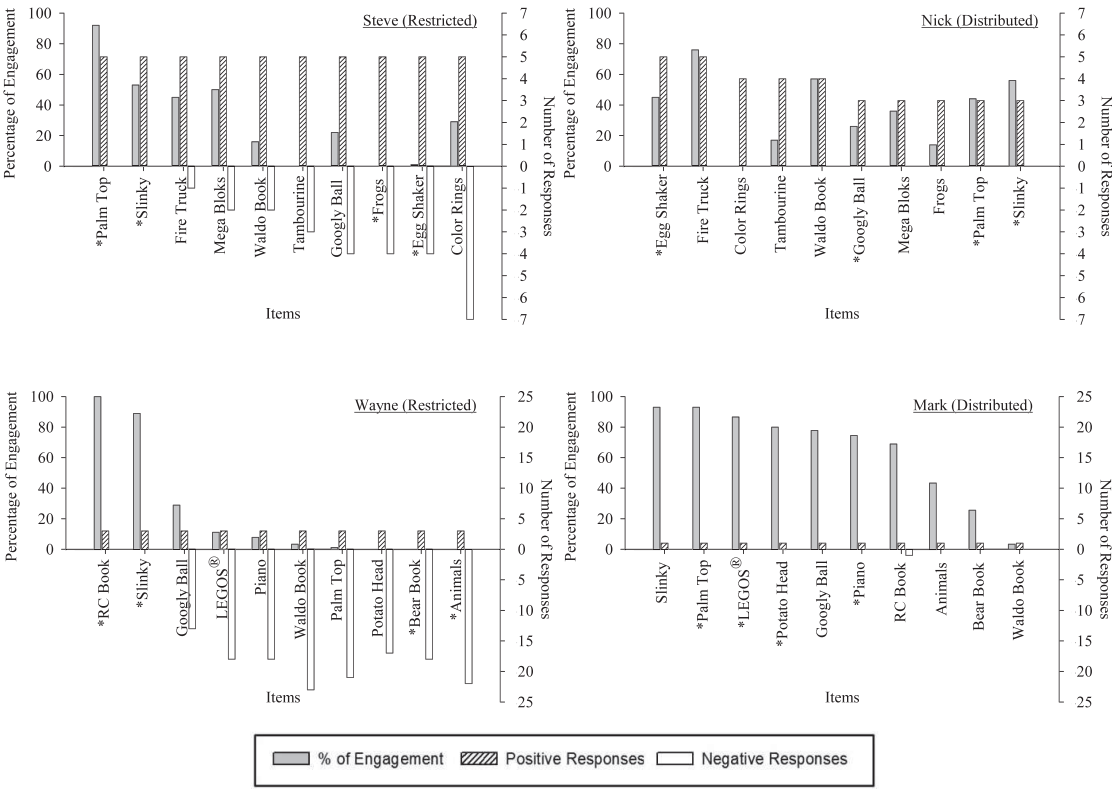


Figure 1. Results from Phase 1 are depicted for student participants. Items are listed across the *x* axis. Percentage of engagement is plotted on the primary *y* axis. Frequency of positive responses is upward on the secondary *y* axis. The number of negative responses is plotted downward on the secondary *y* axis. The asterisk indicates items selected for inclusion in Phase 2.

RESULTS

Phase 1. Figure 1 illustrates the results from Phase 1 for each of the students. For Steve, the Playskool Palm Top and Slinky were selected to determine whether his high levels of engagement would reinforce teacher presentation of these items. The jumping frogs and egg shaker were selected to determine whether his negative responses to the presentation of these items and lack of engagement would decrease teacher presentation of these items.

Items for Nick were selected to determine whether his relatively similar responding to the presentation of these items would correspond with undifferentiated presentation of these

items. Therefore, we selected the egg shaker, Playskool Palm Top, googly ball, and Slinky.

The roller coaster book and Slinky were selected based on Wayne’s high levels of engagement with those items. The bear book and animals (i.e., animal figurines) were selected because they produced frequent negative responses and low levels of engagement. For Mark, the Playskool Palm Top, Legos, Potato Head, and piano produced similar responding and were selected for inclusion in Phase 2.

Phase 2. Figures 2, 3, and 4 depict the results for the three teachers who were observed while interacting with Steve and Nick. Figures 5 and 6 depict the results for the two teachers who presented items to Wayne and Mark.

Erica

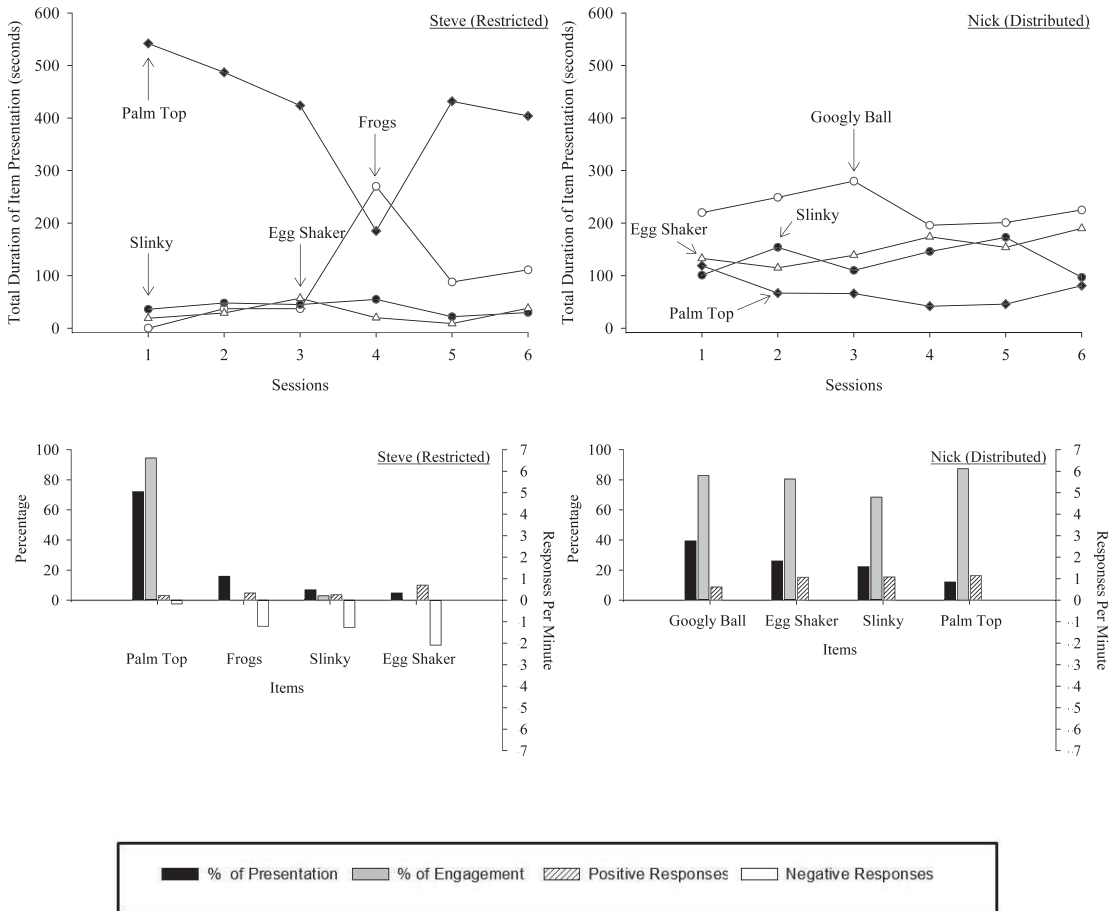


Figure 2. Results for Erica (teacher). The left panel depicts results for her presentation of items to Steve; the right panel depicts results for her presentation of items to Nick. The top panel depicts total duration of item presentation across sessions for each item. The bottom panel depicts aggregate data for each item. Teacher presentation and student engagement are plotted on the primary axis. Rates of positive and negative student responses are plotted on the secondary y axis.

Results for Erica are depicted in Figure 2. Data on her item presentation appear in the top panels, and data on student participants' responses during item presentation are in the bottom panels. Erica presented the Palm Top to Steve for longer durations than for the other items. Presentation of the Palm Top corresponded with high levels of engagement and low rates of negative responses. Erica presented the egg shaker, frogs, and Slinky for shorter durations than for the Palm Top; those three

items corresponded with low levels of engagement and high rates of negative responses. Erica's presentation of items to Nick was more evenly distributed across items, although the googly ball and Palm Top were presented for the longest and shortest durations, respectively. Presentation of all items to Nick corresponded with similar levels of engagement and no negative responses.

Results were replicated across the four remaining teacher participants and second pair

Lisa

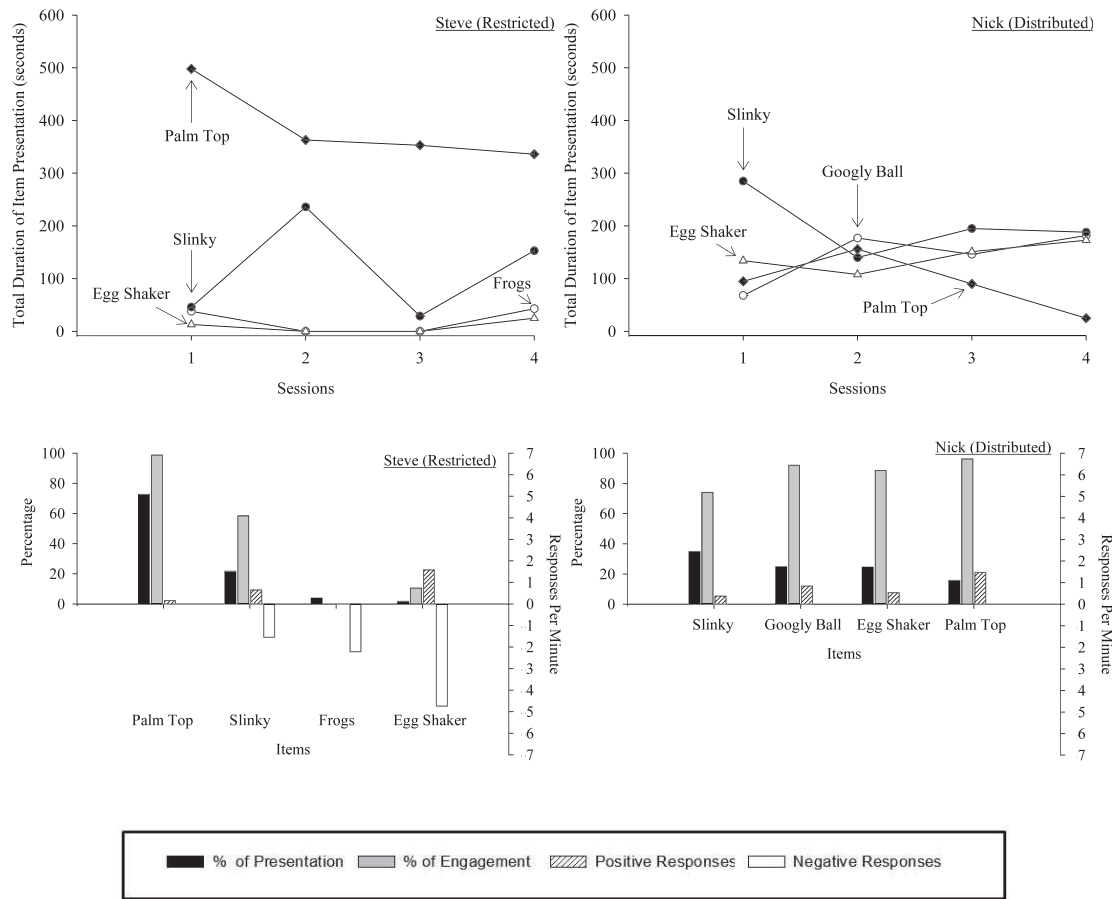


Figure 3. Results for Lisa (teacher). The left panel depicts results for her presentation of items to Steve; the right panel depicts results for her presentation of items to Nick. The top panel depicts total duration of item presentation across sessions for each item. The bottom panel depicts aggregate data for each item. Teacher presentation and student engagement are plotted on the primary axis. Rates of positive and negative student responses are plotted on the secondary y axis.

of student participants. Differentiated responding across items was observed for students with restricted interests, whereas participants with distributed interests responded relatively similarly across items. Teachers participants presented one item for differentially longer durations to the students with restricted interests. Teachers presented the Palm Top for longer durations to Steve and the roller coaster book for longer durations to Wayne. Items presented to participants with restricted interests for

differentially longer durations corresponded with high levels of engagement and low rates of negative responses; items presented for shorter durations corresponded with low levels of engagement and high rates of negative responses. Items were presented relatively evenly to student participants with distributed interests. Relatively even presentation of items to participants with distributed interests corresponded with similar levels of engagement and low rates of negative responses.

Matt

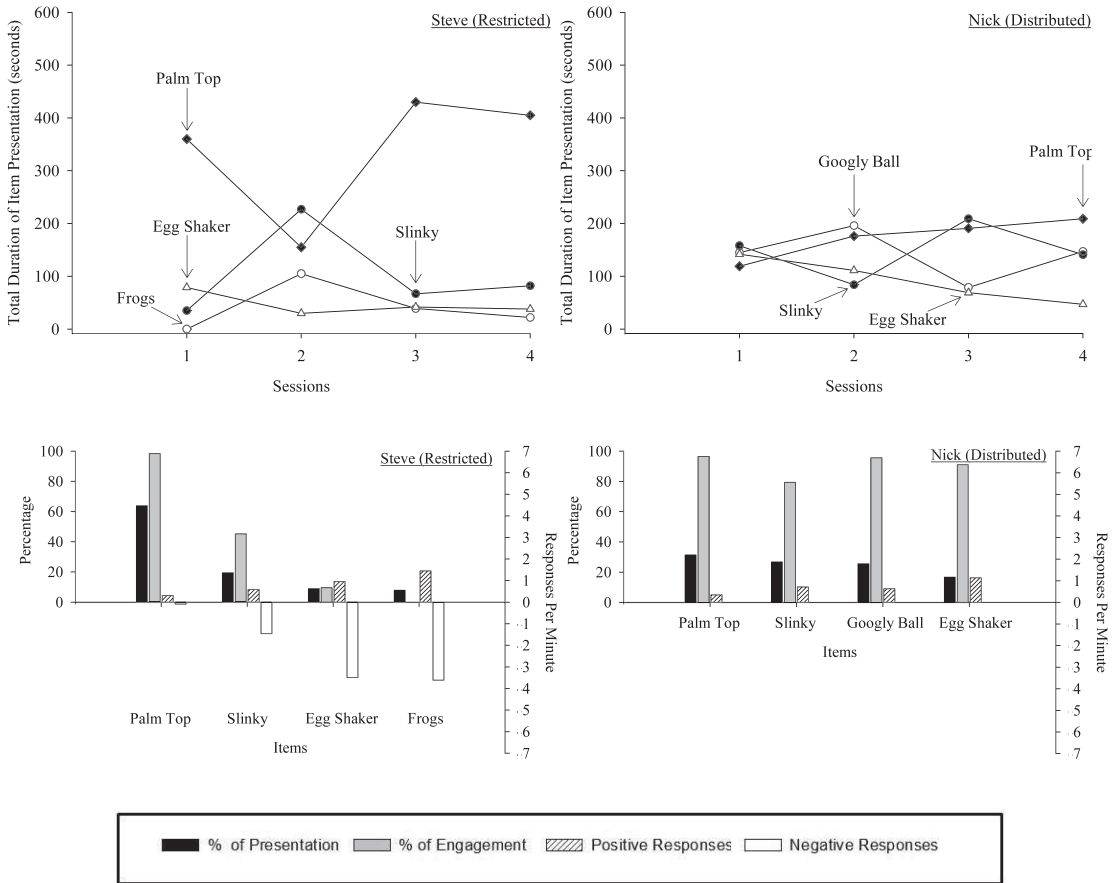


Figure 4. Results for Matt (teacher). The left panel depicts results for his presentation of items to Steve; the right panel depicts results for his presentation of items to Nick. The top panel depicts total duration of item presentation across sessions for each item. The bottom panel depicts aggregate data for each item. Teacher presentation and student engagement are plotted on the primary axis. Rates of positive and negative student responses are plotted on the secondary y axis.

Although the aforementioned pattern was observed across all teachers and student pairs, informal observations by experimenters indicated that the interactions between Amy and Wayne (left panel of Figure 6) were strikingly different. Amy commonly blocked negative responses such as throwing items and kept items present until negative responses were absent for a period of time. Amy was the only teacher observed to prompt appropriate engagement with the items. It is interesting that, under these conditions, Wayne engaged with the bear

book and had fewer negative responses compared to the sessions conducted by Carol and those in Phase 1. Amy was the only teacher participant enrolled in a master's program in applied behavior analysis at the time of the study, and one would expect this history to influence her interactions with the students.

Figures 7 and 8 are event diagrams illustrating within-session data for Steve and Wayne with different teacher participants and are included to highlight the immediate consequences for teacher presentation of items. These

Carol

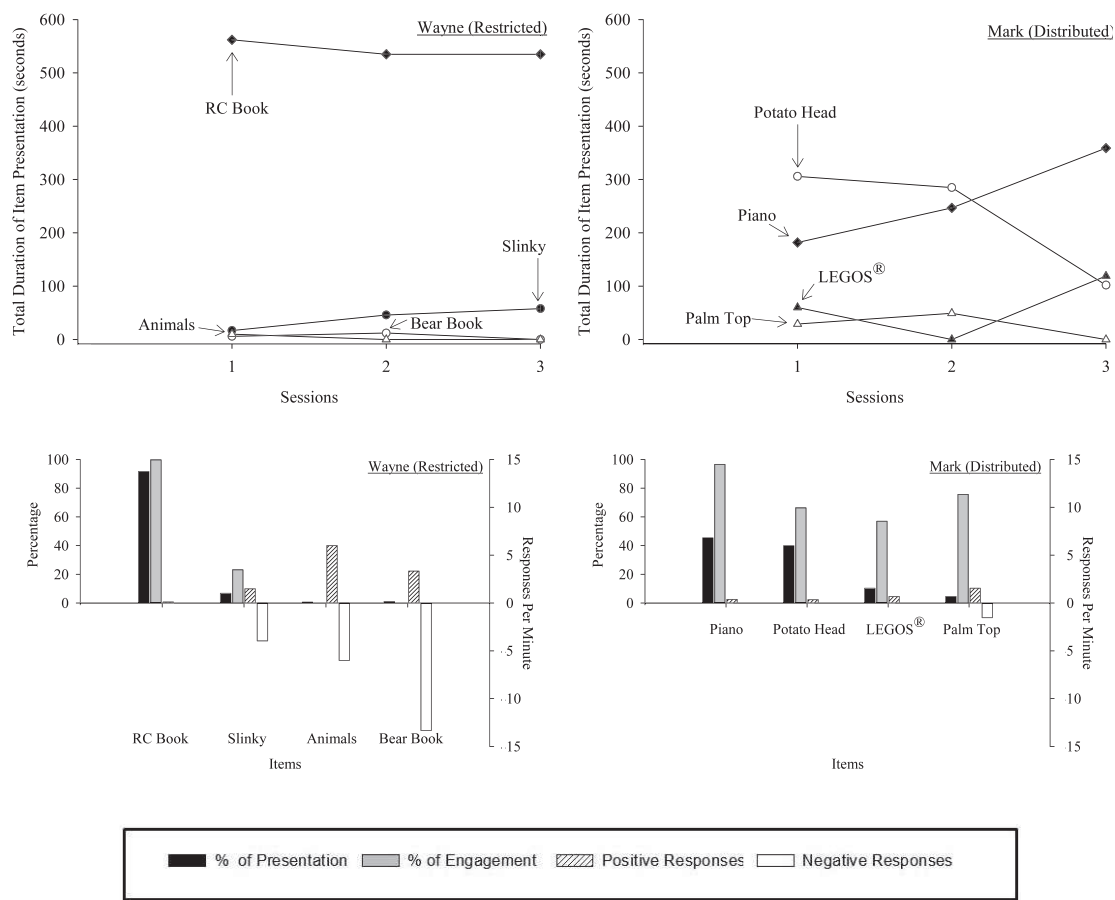


Figure 5. Results for Carol (teacher). The left panel depicts results for her presentation of items to Wayne; the right panel depicts results for her presentation of items to Mark. The top panel depicts total duration of item presentation across sessions for each item. The bottom panel depicts aggregate data for each item. Teacher presentation and student engagement are plotted on the primary axis. Rates of positive and negative student responses are plotted on the secondary y axis.

graphs depict teacher presentation and removal of items and contiguous student engagement and negative responses. At the beginning of Session 1, Lisa presented the frogs, egg shaker, and Slinky. Steve engaged in low levels of item engagement and high rates of negative responses. Lisa then presented the Palm Top, and Steve engaged with the toy without negative responses for the remainder of the session. Figure 8 illustrates similar within-session data with Carol and Wayne. Again, this figure illustrates the differential consequences that were likely re-

sponsible for teacher presentation of the roller coaster book, which was the only item in this session that produced consistent engagement and no negative responses.

DISCUSSION

These findings add to the literature on the possible influence of child behavior on caregiver behavior. Previous studies have reported the relation between child problem behavior and caregiver presentation of demands (Addison &

Amy

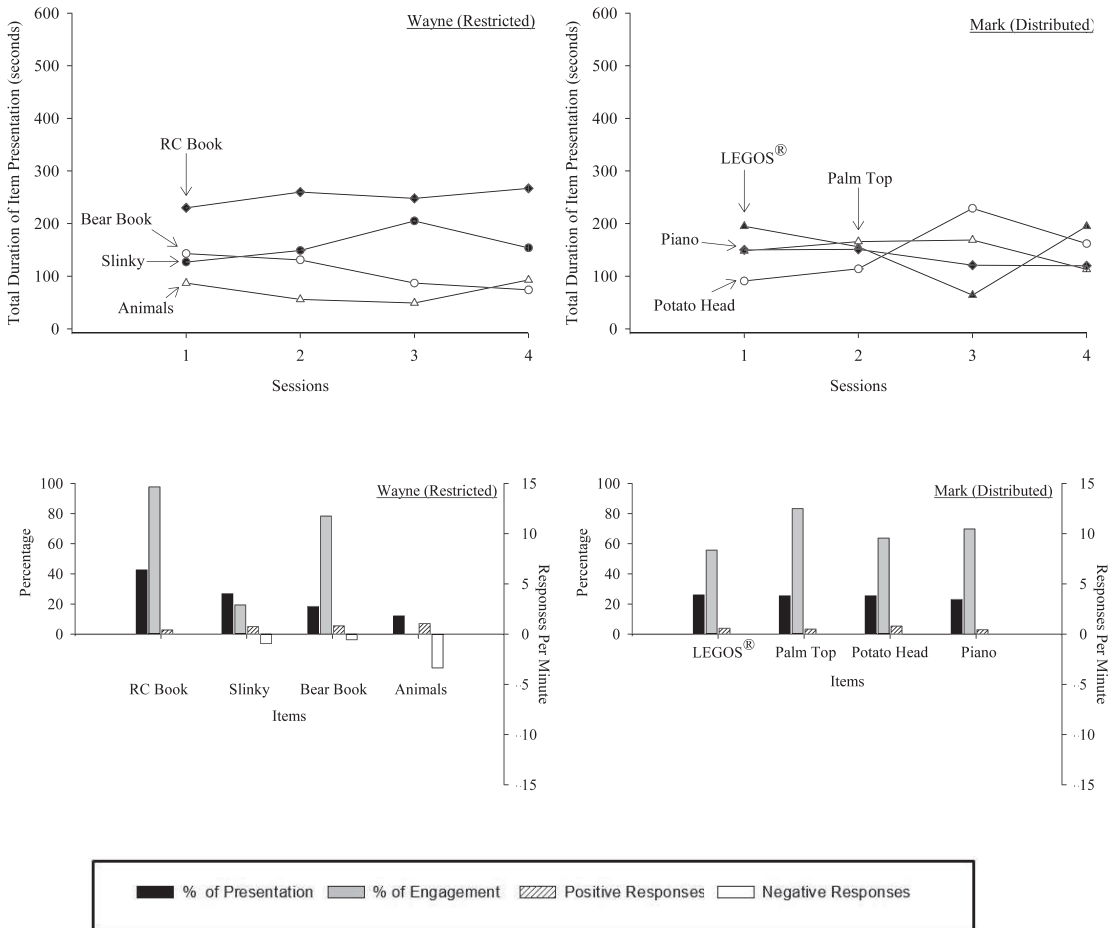


Figure 6. Results for Amy (teacher). The left panel depicts results for her presentation of items to Wayne; the right panel depicts results for her presentation of items to Mark. The top panel depicts total duration of item presentation across sessions for each item. The bottom panel depicts aggregate data for each item. Teacher presentation and student engagement are plotted on the primary axis. Rates of positive and negative student responses are plotted on the secondary y axis.

Lerman, 2009; Carr et al., 1991) and reprimands (Sloman et al., 2005). The current study revealed the likely influence of the behavior of students with autism on teacher presentation of materials. Student participants with restricted interests responded differentially during presentations of different items, and teachers presented one item for differentially longer durations. In general, items correlated with higher percentages of engagement were presented for longer durations, and items correlated with

higher rates of negative responses were presented for shorter durations. By contrast, students with distributed interests responded relatively similarly during presentation of different items, and teachers presented items more evenly to these individuals.

Access to tangible items has been reported as a maintaining variable for a variety of problem behaviors (see Hanley, Iwata, & McCord, 2003, for a review). Yet, Thompson and Iwata (2007) reported the delivery of tangible items to be a

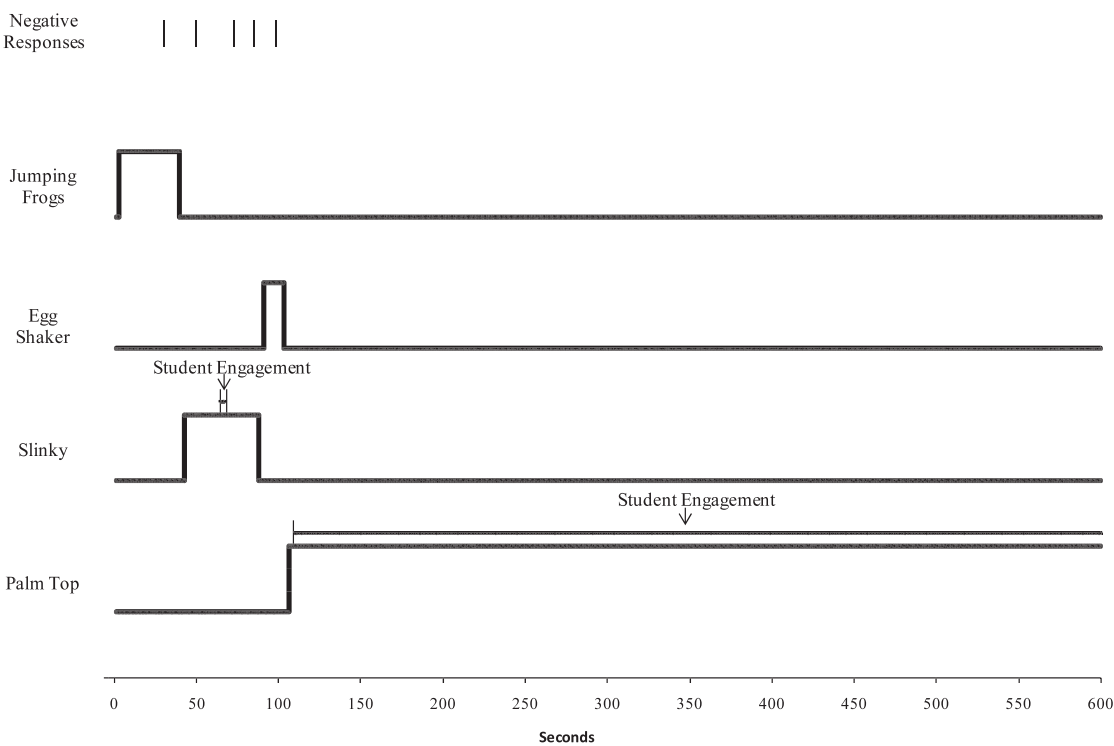


Figure 7. Event diagram of Session 1 for Lisa (teacher) with Steve (student). Within-session data depicting teacher presentation of items, student engagement, and negative student responses. Presentation of an item is noted by blips in the corresponding data path. Student engagement is noted by segmented lines above presentation blips. Negative responses are noted by ticks on the top row.

relatively uncommon consequence following problem behavior. It is possible that designated leisure time is a context under which student problem behavior is more likely to be followed by delivery of preferred tangible items. In the context of designated leisure time, presentation of preferred items following problem behavior could reinforce that response class, and the termination of problem behavior might also provide a simultaneous negative reinforcement contingency for delivering the preferred item. Given that this is a descriptive study, no conclusive statements about functional relations can be made regarding student or teacher behavior; however, results suggest teachers' behavioral sensitivity to the consequences provided by individuals with restricted interests. These data suggest that differential responding across items provided differential consequences

for teacher presentation behavior. A combination of differential reinforcement and punishment likely influenced item presentation to students with restricted interests, resulting in a narrower range of experiences with the array of items. In many ways, the performance of the teacher participants is highly desirable. Teachers demonstrated individualized interactions with students and led unstructured play sessions according to their preferences. In general, teachers presented leisure items in a manner that appeared to minimize undesirable behavior and maximize engagement. Yet, this approach resulted in students with restricted preferences experiencing more limited exposure to the full array of leisure items. The current study does not demonstrate the effects of exposure on participant preferences, but it is possible that presentation of a narrow array will limit expansion of

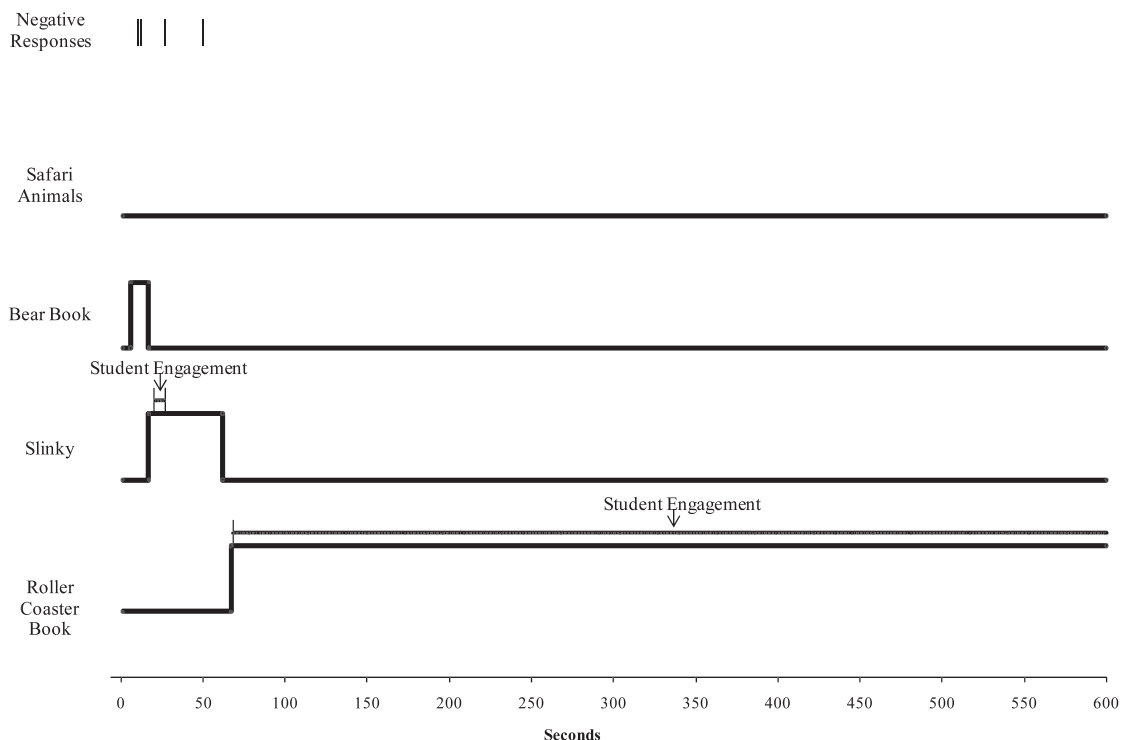


Figure 8. Event diagram of Session 2 for Carol (teacher) with Wayne (student). Within-session data depicting teacher presentation of items, student engagement, and negative student responses. Presentation of an item is noted by blips in the corresponding data path. Student engagement is noted by segmented lines above presentation blips. Negative responses are noted by ticks on the top row.

preferences. It is also possible that restricted interests are a product of automatic reinforcement contingencies and are not influenced by teacher behavior. That is, restricted interests might develop as a result of a specific type of reinforcing stimulation available only with a narrow array of items. Furthermore, restricted interests might result from skill deficits when an individual's limited behavioral repertoire results in reinforcing interactions with only a small subset of materials. A more complete understanding of the variables that contribute to restricted interests will inform intervention when expansion of preferences is identified as a goal.

This study adds to the literature that has investigated contingencies that affect caregiver behavior (e.g., Carr et al., 1991; Sloman et al., 2005). The identification of child effects on caregiver behavior highlights the bidirectional

nature of interactions and is necessary for a complete understanding of the development and maintenance of behavior. In addition, a description of variables that potentially control caregiver behavior should inform the development of training programs that must be designed to promote adherence to effective programs despite a history of caregiver-child interactions that might otherwise perpetuate problem behavior.

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